

Land use and high groundwater conflicts

In contrast to the groundwater issues above that relate to a lack of sufficient groundwater quantity, too much groundwater can also be a problem. A dramatic example was when Southern Wisconsin experienced record amounts of precipitation from August 2007 through July 2008. Severe flooding occurred across this region, resulting in significant property loss, human displacement, and disruption of transportation. While most of the initial flooding occurred as surface water overflow, longer-term groundwater flooding remained for many weeks or months following the rain events. Groundwater flooding occurs when the water table rises above the land surface, and can be long-lasting because water-table decline requires drainage of an entire aquifer. Seepage lakes may also experience flooding of shoreline beaches and developments due to a rise in the water table elevation and the related long-term increase in lake stage.

Several communities recently affected by elevated groundwater levels experienced a return to drier conditions in the first half of 2012. Examples include Clear Lake, in Rock County, where the lake stage increased by about 7 feet in 2009, but returned to previous conditions in May 2012. In Spring Green, 4,378 acres outside of areas currently designated as floodplain by the Federal Emergency Management Agency (FEMA) flooded for over five months in 2008. Modeling and field investigation indicate this flooding was caused by water table rise above ground surface. Mitigation of high groundwater elevations in Spring Green included a \$5.4 million FEMA grant in 2009 to acquire and demolish 28 flood damaged homes.

Although the hydrogeologic setting varies among affected areas, the widespread occurrences of groundwater flooding and the regional nature of intense precipitation events in 2007 and 2008 suggest this is a regional issue. A recently completed study of affected hydrologic systems and climate change, funded by the UW System., suggests that years of extremely high water table conditions may still occur but will remain relatively rare in this century (Joachim et al, 2011). Water resource managers should expect to see some years of high recharge amongst overall less recharge on average. The study concluded that warmer climate conditions will increase evapotranspiration and result in a reduction of groundwater recharge under certain crop types or land cover. Specifically related to the Spring Green region, the study indicated that water table fluctuations up to 3 meters should be expected in planning basement and foundation depths, road construction, or design of on-site wastewater treatment systems.

Reference:

Joachim DR, Gotkowitz MB, Vavrus SJ, Loheide SPI, Bradbury KR. 2011. Forecasting Impacts of Extreme Precipitation Events on Wisconsin's Groundwater Levels, Wisconsin Geological and Natural History Survey, Open File Report 2011-03